

Does employment during doctoral training reduce the PhD completion rate?

Saule Bekova

To cite this article: Saule Bekova (2019): Does employment during doctoral training reduce the PhD completion rate?, *Studies in Higher Education*, DOI: [10.1080/03075079.2019.1672648](https://doi.org/10.1080/03075079.2019.1672648)

To link to this article: <https://doi.org/10.1080/03075079.2019.1672648>



Published online: 10 Oct 2019.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)



Does employment during doctoral training reduce the PhD completion rate?

Saule Bekova 

Institute of Education, National Research University – Higher School of Economics, Moscow, Russian Federation

ABSTRACT

This paper examines relations between doctoral students' employment and graduation outcomes at a research-intensive university in Russia. Since most doctoral students lack financial support, they find employment and work full-time. This study addresses two questions: first, how the employment status is related to graduation outcomes (defending a thesis) and, second, how characteristics of student employment decrease the chances of defence of a thesis. The research is based on a longitudinal dataset of doctoral students that were enrolled in doctoral programmes between 2008 and 2017. The dataset combines survey data collected during the doctoral training and administrative data about the students' graduation outcomes gathered in 2018. The results show that on-campus employment increases the chances to defend the thesis and off-campus employment is negatively associated with the completion. The findings may help define the groups of students that are at risk of attrition and should be provided with appropriate support.

KEYWORDS

Doctoral education;
retention; employment;
graduation outcomes; Russia

Introduction

The increase in supply of highly skilled graduates is considered today as a necessary condition for innovations, technological development, and economic growth (Auriol 2010). Doctoral education has a mission to produce highly skilled graduates and thus contribute to economic development. The number of doctoral students and PhD holders is constantly increasing (Cyranoski et al. 2011; OECD 2014). However, a large proportion of PhD students never graduate (Council of Graduate Schools 2008) and time to degree increased dramatically over the years (NSF 2018). The high number of students who leave doctoral programmes and extended time to earn a degree lead to significant losses.

On the individual level, students lose their investments in doctoral training (Leonard, Becker, and Coate 2005; MLA Office of Research 2016). In addition to economic and time losses, dropping out from the programme is associated with psychological risks (McCormack 2005; Ampaw and Jaeger 2010) and can be viewed by doctoral students as a failure (Lovitts 2001). Studies showed that dropout at earlier stages is less severe in its consequences (Golde 2005; Lott, Gardner, and Powers 2009); however, many doctoral students leave the programme during the final stages (Gardner 2008).

On the institutional level, a high attrition rate may serve as a warning about the following problems in doctoral programmes: ineffective selection process, issues in advisors' appointments, heavy psychological climate, and insufficient student support (Golde 2005; Leonard, Becker, and Coate 2005). The supervisors, the department, and the university lose all the resources (time,

knowledge, money) that were invested into doctoral student training after a student leaves (Ampaw and Jaeger 2012). These losses are crucial for the countries with state-funded educational programmes where the high attrition rate is considered as an inefficient public spending. Russia is one of such countries.

The share of Russian PhD graduates, who defended their theses, within the expected period, has been steadily decreasing since 2007. In 2017, the dropout rate hit an all-time low, with 87% of graduates not defending their theses.¹ In Russia, this situation is exacerbated by the fact that the number of doctoral students in Russia is significantly less than in developed countries, and the high dropout level raises the risk of shortage of academic staff. The number of PhD graduates per year in Russia is almost 30 times less than in the USA and 15 times less than in Germany.² Moreover, the average age of university staff in Russia is constantly increasing, and the share of employees over 60 years is steadily growing (Gusev 2015). The ageing of academic staff without sufficient number of new academics can be a significant risk for higher education sector.

Although the attrition rate is extremely high, the state regulation and requirements for the defence are only getting tougher; the quantity and quality of publications required for the defence have increased. These changes were motivated by the massification of doctoral education in the 1990s, a decreasing quality of theses and the thesis black market growth (Terentev, Bekova, and Maloshonok 2018). In addition, students often decide to go to doctoral programmes due to non-academic motives, for example, a draft deferment for male students (Maloshonok 2016). In such circumstances, the study of dropout factors can provide data for decision-making at the university and country level.

Despite the almost complete absence of dropout factor studies, public discussion in Russia views doctoral student employment, caused by low financial aid, as one of the key reasons for a high dropout rate (Balabanov et al. 2003). Doctoral education is state-funded and PhD students receive scholarships but these scholarships are not enough to consider it as the main source of income. Thus many doctoral students seek for full-time employment elsewhere (Bekova and Dzhafarova 2019). Moreover, most Russian doctoral programmes are full-time and involve a significant workload. Employment and study in the doctoral programme should be in conflict with one another. However, common beliefs about the negative effects of employment on graduation outcomes have no empirical evidence yet. This research aims to fill this gap by studying how students' employment and balancing work and study relate to graduation outcomes and which characteristics of student employment decrease the chances to defend their theses.

The study is based on a longitudinal dataset on doctoral students who were enrolled in doctoral programmes at the Russian university between 2008 and 2017. The dataset combines survey data collected during the doctoral training and administrative data about students' outcomes, gathered in 2018, after their graduation. The findings may help to define the groups of students that are at risk of attrition and, therefore, should be provided with the appropriate support. In addition, it may help to decrease the dropout rate by providing evidence for policy makers at the university and national level. It is especially important for the countries with the lack of data and excessive state regulation of doctoral programmes (Schiermeier 2005).

Background and previous research

The studies of dropout factors examine different characteristics associated with doctoral completion (Wright and Cochrane 2000; Bair and Haworth 2004; Sverdlik et al. 2018). Combining study with work as a dropout factor was actively studied during the 1980s in the US universities (Schultz 1983; Grissom 1985; Sauer 1986). In the meta-synthesis review of dropout factor studies, Bair and Haworth (2004) reported inconsistent results about relations between students' employment and graduation outcomes. Students that did not get a degree considered employment during doctoral training as an obstacle to obtaining a degree, while completers believed that employment has contributed to

their progress. Warren (2002) assumed that employment is essential only in conjunction with other factors, for example, low interest in learning.

Later studies shifted to the focus on the differences of funding where students' employment off-campus was considered as a form of self-funding. A review of studies about the relationship between funding and graduation outcomes stresses the importance of funding for completion and the significant differences between students with different forms of provided financial aid (Bair and Haworth 2004). Various forms of financial aid provided by the university are connected with different completion rates. Forms of financial support that allow students to focus completely on their theses (fellowships, grants) relate to higher completion rates (Ampaw and Jaeger 2011; Van der Haert et al. 2014). Scholarship not only increases the chances to defend the thesis but also decreases the time to the degree (Spronken-Smith, Cameron, and Quigg 2018). PhD funding also has a positive effect on research productivity, both during doctoral training and after (Horta, Cattaneo, and Meoli 2016). Research stresses that the relationship between funding and graduation outcomes should be considered with references to gender, race and field of study because these parameters can shape the student experience and outcomes (Mendoza, Villarreal, and Gunderson 2014). Studies showed that there are no differences between fields of study among students with different forms of financial aid, but the differences appear for unfinanced students with lower completions in humanities (Van der Haert et al. 2014). For this research, such control characteristics as gender, field of study, mode of study will be examined.

Combining doctoral study with work became a popular justification for the high dropout rate in Russia due to extreme lack of funding during the PhD programme (Maloshonok and Terentev, 2019a). Although almost all doctoral programmes in Russia are state-funded, the financial support of doctoral students is very low. The guaranteed monthly stipend for each doctoral student is approximately \$50–100 (it is 15–30 times lower than the average monthly nominal wage³). Low financial support, combined with a low-income bracket in Russia, puts doctoral students in a disadvantaged position.

Typically, universities in Russia cannot provide a sufficient number of positions for doctoral students, and most of them work off-campus (Bekova and Dzhafarova 2019). Previous studies showed the negative impact of working off-campus on students' outcomes (Bair and Haworth 2004; Willis and Carmichael 2011; Vassil and Solvak 2012). We also expect that working off-campus and full-time jobs will have a negative impact on the probability of obtaining a degree. Positions of teaching and research assistants in Russia are not well-paid (approximately \$150 per month) and usually imply a full-time job (approximately 900 hours of teaching workload per year or approximately 40 hours per week for research positions). In addition, 25% of students that work on campus occupy administrative positions, and their work is not related to their thesis projects (Bekova and Dzhafarova 2019).

To overcome limited financial aid, the university where the study was conducted launched an advanced doctoral programme in 2010. This programme is more competitive than the typical selection process but provides considerable academic and financial support for doctoral students. Research showed that such interventions have a significant impact on students' results (Geven, Skopek, and Triventi 2018). It seems reasonable to assume that students selected for this track will have more chances to defend their theses.

Apart from financial challenges, Russian doctoral programmes are characterized by a formal selection process that results in the possibility of doctoral students with non-academic motivations to pursue a degree (Maloshonok and Terentev, 2019a). Thus, one popular reason to go into a PhD programme for male students is to obtain a draft deferment (Maloshonok 2016). Male doctoral students obtain deferment for the period of study, and after receiving a PhD, they are freed from obligations to do a military service. In addition, a substantial share of doctoral students decides to obtain a degree to pursue a non-academic career (Bekova et al. 2017), although Russian doctoral programmes are still mostly oriented to train staff for universities and research institutes (Bednyi 2017). Studies showed that students pursuing a PhD for an academic career report a higher level of satisfaction during

the study (Bekova and Dzhafarova 2019). That may result in a better chance of these students to finish their doctoral training.

Based on the previous studies we can suggest the following hypotheses:

- Graduation outcomes will be related to doctoral student employment status during the doctoral training.
- Employment on campus and a previous degree obtained in the same university will increase chances to obtain a degree.
- The advanced doctoral programme, as a tool of financial and academic support, will enhance the students' chances to obtain a degree.
- Academic orientation of students will contribute to their defence chances.

The conceptual scheme of the study will be the following (Figure 1).

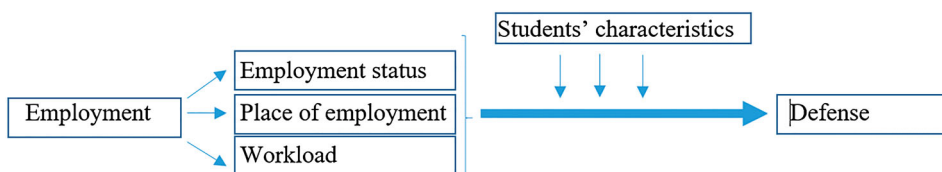
The Russian context

In Russia, PhD training is provided mostly by universities.⁴ To enter a programme, doctoral students have to obtain a master's or a specialist⁵ degree and pass three formal exams (Foreign Language, Philosophy and a subject-specific exam). The law allows universities to use additional criteria, but not many of universities use this opportunity, and the selection process changes very slowly (Terentev, Bekova, and Maloshonok 2018). The period of study is limited to 3–5 years, depending on the field and mode of study. During this normative period of study, PhD students are affiliated with the university, provided with a stipend and, sometimes, a dorm and are expected to defend the thesis at the end of this period. Doctoral education in Russia is a system of training of academic staff; hence, within this period, students obtain not only research but also teacher training. Every doctoral student has to obtain credits for several required and elective courses, present the results of their research at seminars and conferences, publish several research papers (usually not less than 2–3 publications), and prepare the manuscript of the thesis. Students' progress is assessed at the end of every training year, and, if students do not meet the requirements, they can be dismissed. If they meet all the criteria at the end of the third year, they graduate and receive a diploma (these students are called graduates). To receive a degree, PhD students have to publicly defend their research.

As an indicator of completion rate, official state statistics use the share of graduates that defend the thesis at the end of the normative period of study. After 2013, the number of defences has been steadily decreasing, and last year, only 13% of graduates were awarded a PhD. However, we have to keep in mind that PhD students can defend their theses later, but the official statistic does not provide such information (Table 1).

The university

The study is based on the data collected in one of the leading Russian research universities. The university has approximately 900 doctoral students split between 15 scientific fields, from which over



Pic. 1. Conceptual scheme of the study

Figure 1. Conceptual scheme of the study.

Table 1. The number of enrolled students, graduates and defences among graduates in Russia, 1996–2018.

Year	Enrollment, thousand pers.	The number of graduates, thousand pers.	The number of PhD among graduates, thousand pers.
1996	29.0	11.9	2.9
1997	32.7	14.1	3.6
1998	34.4	18.0	4.7
1999	37.7	22.0	6.0
2000	43.1	24.8	7.5
2001	45.2	25.7	6.2
2002	46.9	28.1	7.4
2003	47.8	30.8	8.4
2004	47.7	32.6	10.3
2005	46.9	33.6	10.7
2006	50.5	35.5	11.9
2007	51.6	35.7	11.0
2008	49.6	33.7	8.8
2009	55.5	34.2	10.8
2010	54.6	33.8	9.6
2011	50.6	33.1	9.6
2012	45.6	35.2	9.2
2013	39.0	34.7	9.0
2014	33.0	28.3	5.2
2015	31.6	25.8	4.7
2016	26.4	26.0	3.7
2017	26.1	18.1	2.3
2018	27.0	11.7	2.2

Source: Data of Federal State Statistical Service (http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/population/education/#).

100 doctoral students are awarded a PhD each year. Most students study full-time, and the social science students make up the largest cohort in the university.

Despite this is a case-study of one university, the findings may be considered as indicative for Russian doctoral programmes. The university is a platform for many initiatives that were tested here for the first time in Russia, and then were spread to the rest of the universities (Abramov, Gruzdev, and Terentev 2017). Using the data of one university has limitations in generalization, but it allowed collecting rich longitudinal dataset with actual graduation outcomes. In addition, the university we study has much more resources to support doctoral students and provide them with better conditions to study and work than many others. Therefore, if the university faces problems with doctoral students, then the scale of these problems in other universities would probably be higher. In addition, the studied case is a young and fast-growing research university, and the findings might be relevant for the countries that face challenging transformations and are currently trying to step into the international academic labour market.

Methods

Data and sample

Most studies of doctoral dropout factors are cross-sectional and usually use plans to complete or drop out as outcome indicators (Crede and Borrego 2014; Castelló et al. 2017). Cross-sectional studies cannot provide information about actual completion, while self-reported plans may differ much from actual students' outcomes. This study overcomes this limitation by using a longitudinal dataset. To identify the relations between employment characteristics and graduation outcomes, the following two sources of data were combined:

- (1) The cross-sectional data of doctoral students' surveys, conducted in 2012, 2015, and 2016 ($N = 655$). The university conducts doctoral student surveys repeatedly to measure student experience, satisfaction, and assessment of the programme during their doctoral training. These

data are used to keep track of the doctoral programmes and improve them. During the survey, students were asked about:

- their previous education and background;
- level of satisfaction with the programme characteristics;
- current employment.

The respondents were current doctoral students from all the doctoral schools. Data were collected in May of every academic year using an online survey. Each student got an email with the individual link and two reminders after, if the survey was not completed. The questionnaire was available for four weeks. The response rate was approximately 42% (43% in 2016, 41% in 2015 and 46% in 2012), which is higher than the typical response rate for online surveys (Nulty 2008). The response rate varies between 29% and 71% for different programmes, and from 38% to 60% for different years of study.

Use of the individual links allowed matching these data with the university's administrative records.

- (2) Administrative data were gathered by the doctoral office for every cohort of doctoral students after the graduation and updated every year after, to report about the number of defences as a performance indicator. This dataset contains information about students and scientific advisors' names, the theses titles, information about the committee and the dates of the public defence. We used the dataset to measure the dependent variable (result of doctoral training – defence or dropout).

We select for the analysis only those students that had not less than four (full-time) or five (part-time) years after entrance to the doctoral programme. The final dataset after deduping consists of 655 doctoral students.

Variables

Graduation outcomes are the main dependent variable in this research. There are several possible options:

- (1) PhDs: those who graduated and defended a thesis.
- (2) All but dissertation: students who graduated and received a diploma but did not defend a thesis within the studied period.
- (3) Expelled: those who did not meet the annual programme requirements and were dismissed.
- (4) Leavers: those who voluntarily withdrew from the doctoral programme.⁶

Students that are in the first category will be considered as completers, and the last three categories will be considered as dropouts in this research.

We also count time to degree, the number of years that it takes to defend the thesis.⁷ For the studied university, most of the students defend the thesis within the expected period or one year later; other options are rare. We did not obtain a continuum for linear regression, so we cannot use this variable.

Independent variables

- (1) Predictors: variables about employment status (dummy, 1 if student is employed), employer (dummy, the university = 1), and workload (dummy, full-time = 1).
- (2) Control variables:

We used the following student characteristics:

- Gender (dummy, female = 1),
- Field of study (recoded to set of dummy variables with 'social sciences' as the referent category),
- Mode of the study (dummy, full-time = 1),
- The advanced doctoral programme (dummy, yes = 1),
- Information about prior graduate degree (dummy, 1 if a student obtains a previous degree in the same university),
- Academic career as a motive to pursue a degree (dummy, yes = 1),
- Plan to work in the academia after graduation (dummy, yes = 1),
- Research assistant position in the university (dummy, yes = 1) (Table 2).

To characterize the relation between graduation outcomes and students' employment, logistic regression was used with graduation outcomes (defence or dropout) as a dependent variable. The results of the multicollinearity test indicated a low level of multicollinearity (Table A1 in Appendix).

Results

Only 36% of surveyed students defended their theses up to 2018. Other students graduated without defence (30%), were dismissed (19%), or quit the programme before graduation (15%). Most doctoral students who receive their degree defend the thesis within the expected period (3 or 5 years) or a year after (78% of full-time students and 79% of part-time students). Theoretically, a student can work on a thesis after withdrawal, but it is quite rare. The share of PhDs among those who graduated the programme is much higher than among those who were dismissed or left the programme (55% vs. 5%). The percentage of full-time students who defended their theses was 39%, compared to only 29% of part-time students. There are no differences in the completion rates between male and female defendants and between students from different fields of study.

Table 2. Characteristics of the Doctoral Student Survey respondents.

Variable	Mean/Share
Defended thesis	37%
Time to degree	4.23 (sd = 0.86)
Gender (female)	58%
Full-time study	80%
Field of study:	
• Economics	37.7%
• Social sciences	28.9%
• Law	15%
• STEM	11.3%
• Humanities	7.2%
Graduation year	
2012	9.6%
2013	20.5%
2014	18.0%
2015	15.6%
2016	17.4%
2017	18.9%
Advanced doctoral programme	11%
Graduated from the same university	55%
Plan to work in academia after graduation	43%
Full-time job	65%
Academic career as a motive to pursue a degree	67%
Research assistant position at the university (among employed on campus)	55%
Employment	84%
Employer	31%

To investigate the relationship between obtaining a PhD and employment characteristics, we build logistic regression models. The first model includes only predictors about the students' employment characteristics: employment status, workload and the place of employment. The second model adds all the control variables.

The first model shows that employed students have more chances to defend their theses (Table 3), although the analysis did not confirm differences between students employed full-time and part-time. After adding the control variables, the relationship between employment characteristics and the defence did not change. On top of that, model 2 shows that students selected for the advanced doctoral programme and students that plan to work in academia after their graduation have higher completion rates.

Employment is negatively associated with completion. Employed students have a lower completion rate than unemployed students. To understand the difference between doctoral students employed and not employed on campus, we build the model for two subsamples: employed on campus and not employed on campus (employed off campus and not employed at all) (Table 4).

The models showed that different factors are significant for thesis defence in these two groups. For doctoral students not employed on campus, academically oriented students (those who decide to pursue a degree to build an academic career and plan to work in the university after the graduation) have more chances to defend the thesis. In addition, it is important whether they graduated from the university or not. Students who graduated from the same university before entering a doctoral programme defend the thesis more often. Employment itself has a negative impact on the outcomes. Unemployed students have more chances to defend the thesis in comparison with students employed off-campus.

For students employed on campus, no significant relationships with these factors were found. The critical success factor for these students is their positions in the university. Students that occupy research assistant positions defend theses more often than students that work as instructors or administrative staff at the university. Participation in the advanced doctoral programme that implies greater financial and academic support has a positive impact for both groups.

In summary, we can observe four groups based on employment characteristics: (i) students employed on campus in a research position, (ii) students employed on campus not in a research position (instructors or administrative staff), (iii) students not employed, and (iv) students employed off-campus. Doctoral students that occupy a research position in the university

Table 3. Regression models.

Predictors	Defence – Model 1		Defence – Model 2	
	Odds ratios	CI	Odds ratios	CI
Intercept	0.80	0.52–1.24	0.38	0.14–1.03
Employment	0.44**	0.24–0.80	0.52*	0.27–0.98
Employer	2.95***	2.05–4.26	2.02**	1.32–3.09
Full-time job	1.09	0.72–1.64	1.39	0.88–2.20
Advanced doctoral programme			3.23***	1.77–5.89
Female			0.75	0.52–1.09
Full-time mode of study			1.05	0.66–1.68
Field – Humanities			1.74	0.83–3.64
Field – STEM			0.96	0.50–1.83
Field – Economics			1.18	0.75–1.85
Field – Law			2.03*	1.16–3.56
Graduated from the same university			1.42‡	0.98–2.06
Academic motives to pursue degree			1.52‡	0.96–2.40
Plan to work in academia after graduation			1.37	0.88–2.14
Observations	630		629	
Cox & Snell's R^2 /Nagelkerke's R^2	0.056/0.076		0.119/0.162	
AIC	806.03		780.66	

Signif. codes: '***' 0.001; '**' 0.01; '*' 0.05; '‡' 0.1.

Table 4. Models for two subsamples.

Predictors	Not employed on campus		Employed on campus	
	Odds ratios	CI	Odds ratios	CI
Intercept	0.34 ‡	0.10–1.15	0.36	0.07–1.87
Female	0.72	0.45–1.16	0.74	0.40–1.39
Full-time mode of study	0.95	0.54–1.66	1.43	0.60–3.40
Field – Humanities	2.52 ‡	0.96–6.62	1.16	0.36–3.71
Field – STEM	1.14	0.51–2.58	0.73	0.24–2.25
Field – Economics	1.12	0.60–2.08	1.41	0.70–2.81
Field – Law	2.16 *	1.10–4.26	2.01	0.61–6.57
Advanced doctoral programme	2.72 *	1.07–6.89	3.49 *	1.49–8.16
Graduated from the same university	1.59 *	1.00–2.51	1.15	0.59–2.22
Academic career as a motive to pursue a degree	1.74 *	1.02–2.96	1.14	0.43–3.04
Plan to work in academia after graduation	1.66 ‡	0.96–2.88	0.98	0.43–2.24
Employment	0.51 ‡	0.25–1.06		
Full-time job	1.49	0.77–2.90	1.40	0.71–2.76
Research assistant at the university			2.27 **	1.24–4.14
Observations		428		201
Cox & Snell's R^2 /Nagelkerke's R^2		0.102/0.143		0.106/0.141

Signif. codes: '****' 0.001; '***' 0.01; '**' 0.05; '†' 0.1.

demonstrate the highest completion rate, while students employed off-campus show the lowest completion rate (Table 5).

Discussion and conclusion

The purpose of this study was to explore how students' employment during the PhD programme relates to graduation outcomes and which characteristics of student employment decrease the chances to defend their theses. Public discussion in Russia explains the extremely low completion rate as students' employment during the PhD programme. The study partially confirms this statement. First, employment is associated with completion, but the effects are significant only in conjunction with the place of employment. Employment increases the chances to defend the thesis for students employed on campus. Otherwise, employment works as a negative factor.

What are the main benefits of on-campus employment for doctoral student success? Cross-sectional studies showed that students employed on campus, in comparison with those employed off-campus, are more satisfied with the study process, more often meet with their supervisors, and find it easier for them, in general, to combine study and work (Bekova and Dzhararova 2019). On top of that, the higher chance of students employed on campus to defend their theses may signal the role of the academic community in student progress (Pilbeam and Denyer 2009). The opportunity to be included in such a community is especially important in systems with the apprenticeship model, when a student communicates primarily with the scientific advisor (Kehm 2006). In such cases, on-campus employment can compensate for poor or inadequate advising and help overcome isolation. However, we assume that the main factor of higher completion chances for students employed on campus is an opportunity to work on the thesis topic. In previous studies we showed that students that work in the university have more chances to be engaged in the activities that develop skills useful in PhD research, and their work is directly related to their PhD theses (Bekova and Dzhararova

Table 5. Completion rate in groups of students with different employment statuses.

Category of employment	Completion rate (%)
Research assistants at the university	62
Not employed	44
Non-research position at the university	41
Employed off-campus	27

2019). In the current study, it has been shown that doctoral students that work as research assistants are more successful in completion than students that occupy teacher or administrative positions.

As such, the best option is to occupy research assistant positions at the university. This option is similar to the model implemented in some European countries (Netherlands, Scandinavian countries) where the doctoral students are regarded as employees and work on a project that is connected with the thesis topic (Bartelse, Oost, and Sonneveld, 2007). There were attempts to implement this system in Russian universities, but these cases are rare (Maloshonok and Terentev, 2019b). The most widespread attitude is to give doctoral students any employment option that can tie them to the university, but the results proved that this attitude can be harmful for their results. Based on completion rates we can conclude that it is better not to be employed at all than to work at the university in a non-research position.

Unemployed students also showed better results in comparison with those employed off-campus. Students employed off-campus have the lowest completion rate and chances to defend the thesis. Studies showed that off-campus work often has little in common with research activity in general and the thesis topic (Bekova and Dzhafarova 2019). The off-campus work may result in students' fatigue and lack of concentration and interest. For students employed off-campus, it takes more time even to commute to the university, to meet an advisor and to go to the courses or the library. Second, doctoral students who work off-campus are less involved in department life, and their lower level of engagement can affect their progress (Girves and Wemmerus 1988). In addition, Willis and Carmichael (2011) conclude that off-campus employment serves as a way of escaping from a negative experience during the doctoral training and as a source of success. Finally, working off-campus can negatively influence the motivation to undertake further study and pursue a degree. The average wage outside academia is higher than starting salary in universities, and it brings into question the economic benefits of a PhD degree.

The importance of motivation was also studied in this research. The results showed that those doctoral students who decided to pursue a degree to build an academic career and plan to work in academia after graduation are more likely to defend their theses. The doctorate programme in Russia is still a mostly academically oriented system that trains staff for universities and research institutes (Bednyi 2017). However, the growth of the diversity of career tracks for PhDs is a worldwide trend (Mangematin 2000; Nerad 2006; Lee, Miozzo, and Laredo, 2010; Gould 2015), and Russia is not an exception. In such circumstances, the rigidity of the doctoral programmes and their predominant focus on students that prefer the academic track can be a significant limitation for the doctorate programme's development.

Unfortunately, this study is limited to a set of variables of the secondary dataset, and we could not include other factors that might influence both employment in the university and retention (like a relationship with the supervisor; the way the thesis topic was selected and its involvement in more significant projects; and students' psychological characteristics).

In addition to employment characteristics, such factors as studying in the advanced track make a positive contribution to thesis completion. The advanced track is a complex parameter that signals student characteristics (students that are in the top of the rating based on entrance exam results are chosen for this track), financial support (students on this track have 10-times higher scholarships) and other academic support (such as international mobility). All of these characteristics may influence graduation outcomes. A successful pass of the entrance exam can be a proxy for many traits that are relevant to graduation outcomes: student skills and performance, psychological aspects and previous experience (Malone, Nelson, and Nelson 2004; Litalien and Guay 2015; Arbelo-Marrero 2016). Financial support provided to students on the academic track can also contribute to chances of completion. A positive relation of availability of financial aid with graduation outcomes was shown in numerous studies (Van der Haert et al. 2014; Litalien and Guay 2015; Horta, Cattaneo, and Meoli 2016). Nevertheless, further research with more detailed information about each of these parameters needs to be completed.

Notes

1. http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/population/education/#.
2. https://read.oecd-ilibrary.org/science-and-technology/oecd-science-technology-and-innovation-outlook-2016_sti_in_outlook-2016-en#page149.
3. http://moscow.gks.ru/wps/wcm/connect/rosstat_ts/moscow/ru/statistics/standards_of_life/.
4. PhD training is also provided by academic institutions affiliated with the Russian Academy of Science, but the share of these PhD students is low (approximately 10% of all doctoral students).
5. A specialist degree is an academic degree conferred by a college or university that was widespread in Russia before joining the Bologna process.
6. There are not many differences between groups 3 and 4, but there is a difference in opportunities to return to the doctoral training. Students from the third category do not have this chance, and in the case they want to do so, they will pay for every component of the training themselves. Students from fourth category can come back and occupy a state-funded spot. It is a typical practice to voluntarily withdraw from the programme for those students who see that they will not cope with the requirement on time.
7. Official statistics provide information only about those who defended their theses within the expected period (3 or 4 years). It is the primary criteria for state assessment of the doctoral program's effectiveness (the state is a primary financial source for doctoral programs and, hence, the principal inspector), and unlike most countries, we do not have data about time to degree – the time that it takes to earn a PhD.

Acknowledgement

Support from the Basic Research Program of the National Research University Higher School of Economics is gratefully acknowledged.

Disclosure statement

No potential conflict of interest was reported by the author.

ORCID

Saule Bekova  <http://orcid.org/0000-0003-4416-2194>

References

- Abramov, R., I. Gruzdev, and E. Terentev. 2017. "HSE as Academic Innovator: Mission-Related Challenges." *Higher Education in Russia and Beyond* 3 (13): 14–15.
- Ampaw, F., and A. J. Jaeger. 2010. "The Effect of Labor Market Conditions and Financial Aid Packages on Degree Completion of Doctoral Students." Paper presented at the annual meeting of Association for Institutional Research, Chicago.
- Ampaw, F. D., and A. J. Jaeger. 2011. "Understanding the Factors Affecting Degree Completion of Doctoral Women in the Science and Engineering Fields." *New Directions for Institutional Research* 2011 (152): 59–73. doi:10.1002/ir.409.
- Ampaw, F. D., and A. J. Jaeger. 2012. "Completing the Three Stages of Doctoral Education: An Event History Analysis." *Research in Higher Education* 53 (6): 640–60. doi:10.1007/s11162-011-9250-3.
- Arbelo-Marrero, F. 2016. "Examining pre-Entry Doctoral Admission Variables and Retention at a Hispanic Serving Institution." *International Journal of Doctoral Studies* 11: 269–84. <http://www.informingscience.org/Publications/3545>.
- Auriol, L. 2010. *Careers of Doctorate Holders: Employment and Mobility Patterns*. OECD Science, Technology and Industry Working Papers, 2010/04. Paris: OECD. <http://dx.doi.org/10.1787/5kmh8phxvfv5-en>.
- Bair, C. R., and J. G. Haworth. 2004. "Doctoral Student Attrition and Persistence: A Meta-synthesis of Research." *Higher Education: Handbook of Theory and Research*, 481–534. doi:10.1007/1-4020-2456-8_11.
- Balabanov, S., B. Bednyi, E. Kozlov, and G. Maksimov. 2003. "Mnogomernaya tipologiya aspirantov" [Multidimensional Typology of Postgraduates]. *Sociologicheskij zhurnal [Sociological Journal]* 3: 71–85.
- Bartelse, J., H. Oost, and H. Sonneveld. 2007. "Doctoral Education in the Netherlands." In *The Doctorate Worldwide*, edited by S. Powell and H. Green, 64–76. London: SRHE and Open University Press. ISBN 9780335220205.
- Bednyi, B. 2017. "Novaya model' aspirantury: pro et contra" [New Postgraduate School Model: Pro et Contra]. *Vyshee obrazovanie v Rossii [Higher Education in Russia]* 4: 5–16.
- Bekova, S., and Z. I. Dzhafarova. 2019. "Who is Happy at Doctoral Programs: The Connection Between Employment and Learning Outcomes of PhD Students." *Educational Studies (Moscow)* 1: 87–108.

- Bekova, S., I. Gruzdev, Z. Dzhafarova, N. Maloshonok, and E. Terentev. 2017. "Portret sovremennogo rossiyskogo aspiranta" [The portrait of Russian doctoral student]. *Sovremennaya Analitika Obrazovaniya [Contemporary Education Analytics]* 7 (15): 1–60.
- Castelló, M., M. Pardo, A. Sala-Bubaré, and N. Suñe-Soler. 2017. "Why Do Students Consider Dropping out of Doctoral Degrees? Institutional and Personal Factors." *Higher Education* 74 (6): 1053–68. doi:10.1007/s10734-016-0106-9.
- CGS (Council of Graduate Schools). 2008. *Ph.D. Completion and Attrition: Analysis of Baseline Demographic Data from the Ph.D. Completion Project*. Washington, DC.
- Crede, E., and M. Borrego. 2014. "Understanding Retention in US Graduate Programs by Student Nationality." *Studies in Higher Education* 39 (9): 1599–1616. doi:10.1080/03075079.2013.801425.
- Cyranoski, D., N. Gilbert, H. Ledford, A. Nayar, and M. Yahia. 2011. "The PhD Factory." *Nature* 472 (7343): 276–9. doi:10.1038/472276a.
- Gardner, S. K. 2008. "What's too Much and What's too Little?: The Process of Becoming an Independent Researcher in Doctoral Education." *The Journal of Higher Education* 79: 326–50.
- Geven, K., J. Skopek, and M. Triventi. 2018. "How to Increase PhD Completion Rates? An Impact Evaluation of Two Reforms in a Selective Graduate School, 1976–2012." *Research in Higher Education* 59: 529. doi:10.1007/s11162-017-9481-z.
- Girves, J. E., and V. Wemmerus. 1988. "Developing Models of Graduate Student Degree Progress." *The Journal of Higher Education* 59 (2): 163–89.
- Golde, C. M. 2005. "The Role of the Department and Discipline in Doctoral Student Attrition: Lessons from Four Departments." *The Journal of Higher Education* 76 (6): 669–700. doi:10.1080/00221546.2005.11772304.
- Gould, J. 2015. "How to Build a Better PhD." *Nature* 528: 22–5. doi:10.1038/528022a.
- Grissom, M. A. 1985. "Attrition after Successful Completion of Doctoral Qualifying Examinations: An Analysis of Characteristics and Attitudes of Doctoral Graduates and Nongraduates." Doctoral diss., University of North Texas, 1985. Dissertation Abstracts International, 46(09A).
- Gusev, A. B. 2015. "Kruglyj stol «Rol' aspirantury v vosproizvodstve nauchnyh kadrov»" [Round Table "The Role of Doctoral Education in Producing of Academic Staff"] *Nauka. Innovacii. Obrazovanie [Science. Innovations. Education]* 17. <http://sie-journal.ru/kruglyj-stol-rol-aspiranturyi-v-vosproizvodstve-nauchnyih-kadrov>.
- Horta, H., M. Cattaneo, and M. Meoli. 2016. "PhD Funding as a Determinant of PhD and Career Research Performance." *Studies in Higher Education* 43 (3): 542–70. doi:10.1080/03075079.2016.1185406.
- Kehm, B. M. 2006. "Doctoral Education in Europe and North America: A Comparative Analysis." In *The Formative Years of Scholars*, edited by U. Teichler, Vol. 83, 67–78. London: Portland Press. Wenner-Gren International Series.
- Lee, H., M. Miozzo, and P. Laredo. 2010. "Career Patterns and Competences of PhDs in Science and Engineering in the Knowledge Economy: The Case of Graduates from a UK Research-Based University." *Research Policy* 39 (7): 869–81.
- Leonard, D., R. Becker, and K. Coate. 2005. "To Prove Myself at the Highest Level: The Benefits of Doctoral Study." *Higher Education Research & Development* 24 (2): 135–49. doi:10.1080/07294360500062904.
- Litalien, D., and F. Guay. 2015. "Dropout Intentions in PhD Studies: A Comprehensive Model Based on Interpersonal Relationships and Motivational Resources." *Contemporary Educational Psychology* 41: 218–31. doi:10.1016/j.cedpsych.2015.03.004.
- Lott, J. L., S. Gardner, and D. A. Powers. 2009. "Doctoral Student Attrition in the Stem Fields: An Exploratory Event History Analysis." *Journal of College Student Retention: Research, Theory & Practice* 11 (2): 247–66. doi:10.2190/CS.11.2.e.
- Lovitts, B. E. 2001. *Leaving the Ivory Tower: The Causes and Consequences of Departure from Doctoral Study*. Lanham, MD: Rowman & Littlefield Publishers.
- Malone, B. G., J. S. Nelson, and C. V. Nelson. 2004. "Academic and Affective Factors Contributing to Degree Completion of Doctoral Students in Educational Administration." *The Teacher Educator* 40 (1): 33–55.
- Maloshonok, N. 2016. "Doctoral Students' Reasons to Pursue a PhD as a Cause of Low Completion Rate of Russian PhD Programs." *Higher Education in Russia and Beyond* 3 (9): 18–20.
- Maloshonok, N., and E. Terentev. 2019a. "National Barriers to the Completion of Doctoral Programs at Russian Universities." *Higher Education* 77 (2): 195–211.
- Maloshonok, N., and E. Terentev. 2019b. "On the way to a New Model of Graduate Study: Experience of Reforms in Russian Universities." *Educational Studies (Moscow)* 3: 8–42.
- Mangematin, V. 2000. "PhD Job Market: Professional Trajectories and Incentives During the PhD." *Research Policy* 29 (6): 741–56.
- McCormack, C. 2005. "Is non-Completion a Failure or a New Beginning? Research non-Completion from a Student's Perspective." *Higher Education Research & Development* 24 (3): 233–47. doi:10.1080/07294360500153968.
- Mendoza, P., P. Villarreal, and A. Gunderson. 2014. "Within-Year Retention among Ph.D. Students: The Effect of Debt, Assistantships, and Fellowships." *Research in Higher Education* 55 (7): 650–85. doi:10.1007/s11162-014-9327-x.
- MLA Office of Research. 2016. *Report on the Survey of Earned Doctorates, 2012–13*. <https://www.mla.org/content/download/40535/1747214/rptSurvEarnedDocs12-13.pdf>.
- Nerad, M. 2006. "Globalization and its Impact on Research Education: Trends and Emerging Best Practices for the Doctorate of the Future." In *Quality in Postgraduate Research: Knowledge Creation in Testing Times*, edited by M. Kiley and G. Mullins, 5–12. Canberra: ANU.

- NSF (National Science Foundation, National Center for Science and Engineering Statistics). 2018. *Doctorate Recipients from U.S. Universities: 2016*. Special Report NSF 18-304. Alexandria, VA. <https://www.nsf.gov/statistics/2018/nsf18304/>.
- Nulty, D. D. 2008. "The Adequacy of Response Rates to Online and Paper Surveys: What Can Be Done?" *Assessment & Evaluation in Higher Education* 33 (3): 301–14. doi:10.1080/02602930701293231.
- OECD. 2014. *Who Are the Doctorate Holders and Where Do Their Qualifications Lead Them?* Education Indicators in Focus, No. 25. Paris: OECD Publishing. <https://doi.org/10.1787/5jxv8xsvp1g2-en>.
- Pilbeam, C., and D. Denyer. 2009. "Lone Scholar or Community Member? The Role of Student Networks in Doctoral Education in a UK Management School." *Studies in Higher Education* 34 (3): 301–18. doi:10.1080/03075070802597077.
- Sauer, J. L. 1986. "Role, Responsibility, and Success in Graduate School." Doctoral diss., University of California, Los Angeles, 1986. Dissertation Abstracts International, 42(102A).
- Schiermeier, Q. 2005. "Pity Poor Postdocs." *Nature* 434: 540–41. doi: 10.1038/nj7032-540a.
- Schultz, M. C. 1983. "'ABD' Doctoral Students from Off-campus Centers of the University of Southern California." Dissertation Abstracts International, 44(02A).
- Spronken-Smith, R., C. Cameron, and R. Quigg. 2018. "Factors Contributing to High PhD Completion Rates: A Case Study in a Research-Intensive University in New Zealand." *Assessment & Evaluation in Higher Education* 43 (1): 94–109.
- Sverdluk, A., N. Hall, L. McAlpine, and K. Hubbard. 2018. "The PhD Experience: A Review of the Factors Influencing Doctoral Students' Completion, Achievement, and Well-Being." *International Journal of Doctoral Studies* 13: 361–88. doi:10.28945/4113.
- Terentev, E., S. Bekova, and N. Maloshonok. 2018. "Krizis rossijskoj aspirantury: istochniki problem i vozmozhnosti ih preodoleniya" [The crisis of postgraduate studies in Russia: what bears problems and how to overcome them] *Universitetskoe upravlenie: praktika i analiz [The Journal University Management: Practice and Analysis]* 22 (5): 52–67.
- Van der Haert, M., E. Arias Ortiz, P. Emplit, V. Halloin, and C. Dehon. 2014. "Are Dropout and Degree Completion in Doctoral Study Significantly Dependent on Type of Financial Support and Field of Research?" *Studies in Higher Education* 39 (10): 1885–1909. doi:10.1080/03075079.2013.806458.
- Vassil, K., and M. Solvak. 2012. "When Failing is the Only Option: Explaining Failure to Finish PhDs in Estonia." *Higher Education* 64 (4): 503–16. doi:10.1007/s10734-012-9507-6.
- Warren, J. R. 2002. "Reconsidering the Relationship Between Student Employment and Academic Outcomes: A New Theory and Better Data." *Youth & Society* 33 (3): 366–93.
- Willis, B., and K. D. Carmichael. 2011. "The Lived Experience of Late-Stage Doctoral Student Attrition in Counselor Education." *The Qualitative Report* 16 (1): 192–207. <https://nsuworks.nova.edu/tqr/vol16/iss1/11>.
- Wright, T., and R. Cochrane. 2000. "Factors Influencing Successful Submission of PhD Theses." *Studies in Higher Education* 25 (2): 181–95. doi:10.1080/713696139.

Appendix

Table A1. The results of the multicollinearity test.

Variable	VIF
Gender	1.120803
Full-time study	1.117820
Field – Humanities	1.273808
Field – STEM	1.368234
Field – Economics	1.582399
Field – Law	1.456195
Advanced doctoral programme	1.173633
Graduated from the same university	1.114223
Academic career as a motive to pursue a degree	1.443357
Plan to work in academia after graduation	1.646752
Employment	1.611011
Full-time job	1.634651
Employer	1.402068